From:	Waters, Laura
To:	Norfolk Boreas
Cc:	Shaw, John R; Perry, Lucy; Dukes, David; Claire Davies; Faulkner, Stephen
Subject:	Local Impact Submission - Norfolk County Council
Date:	31 October 2019 17:14:16
Attachments:	image003.png image005.png image007.png Appendix 1 Map 1 Location of the proposed Vanguard and Boreas wind farms showing proposed landfall.pdf Appendix 2 Map 2 Onshore cable route and grid connection.pdf Appendix 3 Norfolk County Councils response to the Preliminary Environmental Information report November 2018.pdf Norfolk Boreas Local Impact Report Novembe 2019.doc

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Norfolk Boreas Case Team
National Infrastructure Planning
The Planning Inspectorate

Please find attached the County Council's Local Impact Report (LIR) comprising:

(a) LIR (November 2019);
(b) Appendix 1 Map 1
(c) Appendix 2 Map 2
(d) Appendix 3 PEIR Comments (November 2018).

Please could you acknowledge receipt of this email and documents attached.

Please note that the County Council is in active negotiation with the applicant (Vattenfall) on the technical issues raised in the attached documents and expects these to be resolved through the DCO process.

Kind regards
Laura

Laura Waters,
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Campaign Logo

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Norfolk County Council

Local Impact Report

Norfolk Boreas Offshore Wind Farm and Onshore Supporting Infrastructure – submitted Development Consent Order Application

Reference. EN010087

Evidence by Laura Waters BSc (Hons); MSc; MRTPI
Senior Planner

November 2019

Contents

Norfolk County Council – Local Impact Report

Norfolk Boreas Offshore Wind Farm and Onshore Supporting Infrastructure – submitted application

November 2019

1. Introduction

1.1. This report sets out Norfolk County Council's position with regard to the submitted Development Consent Order (DCO) application made under section 56 of the Planning Act (2008).

1.2. The County Council is a statutory consultee given that the proposed development is a Nationally Significant Infrastructure Project (NSIP) under the above Act and is located both:

(a) Adjacent to the County – offshore Wind Farm located in the North Sea (see Map 1 – Appendix 1); and

(b) Within the County with regard to the supporting onshore grid connection infrastructure (see Map 2 Appendix 2).

1.3. The principal role of the County Council in responding to the above wind farm and ancillary onshore infrastructure application, is in respect of the Authority's statutory role as:

- Highways Authority;
- Minerals and Waste Planning Authority;
- Lead Local Flood Authority; and
- Public Health responsibilities.

1.4. In addition, the County Council have an advisory environmental role and economic development function, which has also fed into the response to the DCO application.

1.5. The issues raised below simply relate the County Council's statutory and advisory functions.

2. Background

2.1. The County Council recognises this as a DCO application for an offshore windfarm and onshore ancillary grid connection infrastructure in Norfolk, which will be determined by the Secretary of State for Business, Energy and Industrial Strategy. The application is defined as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008.

2.2. The County Council responded to the pre-application (Section 42 Consultation) version of this proposal in November 2018. At that time the County Council broadly supported the proposal subject to a number of detailed matters being

resolved (see Appendix 3).

2.3. It is understood if both the Norfolk Vanguard and Norfolk Boreas projects secure consent and progress to construction, the advantages of shared infrastructure will be realised. However, the Norfolk Boreas project needs to consider the possibility of the Norfolk Vanguard project not being built. For Norfolk Boreas to be considered as an independent project by the Planning Inspectorate, this scenario must be provided for within the Norfolk Boreas DCO application. Therefore, there are two scenarios which are considered within the DCO application:

- **Scenario 1** - Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas. This scenario is optimal and the most probable outcome.
- **Scenario 2** - Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. The Norfolk Boreas EIA will also consider associated constraints and opportunities, under Scenario 2.

2.4. In the intervening period between the pre-application and submission of the Development Consent Order (DCO) application, the County Council attended the examination hearings on the Norfolk Vanguard project and through discussion at these hearings the majority of issues were resolved. However, the County Council is still working closely with Vattenfall on any remaining outstanding issues.

3. The Proposal – Development Consent Order Application

3.1. The County Council has assessed the proposal on the following basis:

3.2. **Key Offshore Infrastructure**

Location and Distance Offshore	:	Located in one distinct area approximately 73 km respectively off the Norfolk coast (see Maps attached).
Total Site Area		725 sq.km.
Proposed Capacity	:	Installed capacity of 1.8 Giga-Watt (sufficient to supply 1.3 million households with electricity).
Number and size of turbines	:	Range between 90 x 20MW to 200 x 9MW turbines with a maximum tip height of up to 350 metres
Offshore works	:	Interconnector Cables and foundations:
	:	Up to four cables to landfall totalling 500 km (400 within the offshore cable corridor and 100 within the Norfolk Boreas site).
	:	Up to 2 Offshore electrical (sub-station) platforms and 1 accommodation platforms. Maximum size 35,000 sqm. per platform and maximum height of up 100 m.

Key Onshore Works

Landfall Location	:	Immediately south of Happisburgh (1.5 km zone identified - see Maps attached) – all associated infrastructure will be located underground.
Cable route	:	Buried cable route between Happisburgh and grid connection at Necton Substation – approximately 60 km (See Maps attached). Up to 4 cable trenches will be required along an identified 45 m search corridor. The eventual corridor to be submitted with the application (S56) will be 100m; sufficient to accommodate both the Vanguard and Boreas projects in one duct laying operation. The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.
Necton - National Grid Sub-station (Extension)	:	The existing Necton National Grid substation (140 m x 145 m) would require an extension to accommodate the Norfolk Boreas connection points (see Map): • Easterly extension 130 m; • Westerly extension 200 m (total Foot-print 26,000 sqm.) • Maximum height 15 m. The extension would take the existing sub-station from 20,300 sqm. to 65,250 sqm. (tripling the size i.e. when the Norfolk Vanguard (part) is taken into account as well). The above works would be sufficient to facilitate both the Vanguard and Boreas Projects.
Necton - New Sub-station Boreas Project HVDC Convertor	:	A new onshore substation will be required with a total maximum land requirement to the perimeter fence of 250m x 300m (75,000 sqm.); Maximum building height 19 m (HVDC); Plus, temporary construction area 200 m x 100 m (20,000 sqm.); The proposed substation will be located near to the Necton National Grid Substation – see Map attached. This is in addition to a similar size sub-station needed for Norfolk Vanguard project.
Overhead Line Modifications	:	Two new overhead line towers would be required in close proximity to the existing corner tower (to the north east of the existing Necton substation) with a maximum height of 55m. The existing corner tower would be demolished such that the net new number of towers is one.

		Alternatively, the existing corner tower could be modified, and one new terminal tower constructed in close proximity. The design approach taken will be confirmed at the detailed design phase. The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.
	:	Construction time approximately 24-30 months for sub-station and pylon work (this includes groundworks and civil construction elements).
Ancillary Works	:	The onshore work will require, *inter alia*: Construction compounds (see Map)– i.e. support buildings private road and hard standing; Construction of temporary haul roads and access tracks along the onshore cable route; Archaeological and ground investigation; Improvements to highway verges; Highway and private access roads; Works to move sewers, drains; and cables; Works affecting non-navigable rivers, streams or water courses; Landscaping and other works to mitigate any adverse effects of the construction; operation, maintenance or decommissioning of the project including ecological monitoring and mitigation works.
	:	Construction timetable for above onshore works: • The pre-construction works for the onshore cable route would have been completed by Norfolk Vanguard and commencing in 2022 • There are two programmes for installing landfall duct installation - the preferred option is to do them after Norfolk Vanguard in 2024 and 2025. There is however a potential for option for them to be installed at the same time as Vanguard. • The cable pulling is scheduled for 2026 to 2027 • Offshore project substation to be completed in two phases by 2026-2027 • The National Grid substation extension works are likely to run in parallel to the onshore project substation works, commencing with pre-construction works in 2022.

4. Local Impacts

4.1. This section of the report assesses the Environmental Statement (ES) and other supporting documentation in respect of the County Council's key functions and sets out the Authority's proposed response / comments. The response largely relates to the onshore infrastructure required to connect the electricity generated to the National Grid. It should be noted that discussions are on-going with the applicant with regard to over-coming any technical issues.

Overview

4.2. The proposal has a maximum capacity of 1.8 Giga Watts (1,800 MW) of electricity, sufficient to power approximately 3.9 million households (i.e. this represents more than nine times as many dwellings in Norfolk (2011)). Current operational offshore capacity in the UK is just over 4 GW (2015), therefore if consented the Norfolk Boreas proposal would potentially increase the UK's installed capacity by 45%.

4.3. The proposal will generate thirty times more energy than the Scroby Sands wind farm (60 MW) and more than five and half times more energy than the Sheringham Shoal wind farm (317 MW). As such the proposal would make a serious contribution to the Government's Renewable Energy targets and objectives (see Section 5 below).

Comment

4.4. The principle of this offshore renewable energy proposal is supported as it is consistent with national renewable energy targets and objectives, subject to the detailed comments below being satisfactorily resolved with the applicant.

Grid Connection and Electricity Supply Issues

4.5. The decision was taken to use High Voltage Direct Current (HVDC) technology. This decision removes the requirement for a cable relay station and decreases the working width of the onshore cable corridor from 50m to 35m, thereby reducing potential impacts along the cable corridor.

4.6. Grid connection is proposed at Necton and would involve, as indicated above, a significant extension to the existing sub-station taking it from just over 20,000 sqm to over 65,000 sqm (total footprint with the Norfolk Vanguard Project). In addition, there would be the need for a new substation for both the Norfolk Vanguard and Norfolk Boreas projects comprising a further 75,000 sqm each. There would also be a need for up-grading the power lines comprising a new tower (worst case scenario).

4.7. Officers have been in discussion with Vattenfall and other potential offshore windfarm developers regarding the potential for electricity generated from these proposals to be used within the local distribution networks (132 kv and below) i.e. to assist where there are electricity deficits. These discussions have also involved National Grid who have made a formal and legally binding grid connection "offer" to Vattenfall.

4.8. National Grid have indicated that the onshore cables from the wind farms will ultimately belong to a future Offshore Transmission Operator (OFTO). In such circumstances, where the main connection point for the OFTO system is at a

transmission substation (National Grid), the regulatory arrangements governing OFTO infrastructure do not provide for secondary interconnection between the OFTO system and a local distribution network operator (DNO) (i.e. UK Power Networks). In other words, there is no opportunity of "tapping" into the transmission cables and feeding into the local electricity transmission network.

Comment

4.9. It is felt that Vattenfall should work with National Grid and UK Power Networks to consider options regarding the potential to feed electricity into the local transmission networks.

In addition, the County Council will continue to work with the Local Enterprise Partnership (LEP) through the TRI - Local Energy Strategy, in order to lobby central government to make legislative changes to overcome the obstacles to secondary inter-connection raised above.

Socio-Economic Issues

4.10. There are potentially significant economic benefits that may arise from the Boreas proposal in terms of:

- Local employment creation;
- Business sectors affected by construction; and
- Operations and Maintenance (O&M) of the wind turbines.

4.11. The ES suggests that the Norfolk Boreas and Norfolk Vanguard projects will in total create up to 481 jobs during construction and up to 175 jobs during operation. The ES indicates that "there is the potential for moderate long-term benefits to the region due to increased employment across the supply chain serving the offshore wind industry".

4.12. The County Council's Economic Development team has enjoyed regular, constructive dialogue with many members of the Vattenfall team. The company is engaging with local supply chain companies and seems keen to ensure that local businesses can benefit as far as possible from a wide range of contracts as they emerge. The company also shares the County Council's ambition to attract new investment into the area, in particular new manufacturing capacity and has been working with County Council's Economic Development Team in a number of areas. The company has an excellent relationship with Gt Yarmouth Port, which hopefully will lead to its use both during the construction phase and later in respect of operations and maintenance (O&M).

4.13. It is understood that Vattenfall has signed a Memorandum of Understanding with Peel Ports Great Yarmouth in 2017 to explore locating the Swedish energy group's operations base at the East Anglian facility. Both Vattenfall and Peel Ports expect to finalise their agreement in due course. If Vattenfall build both wind farms, they expect to employ up to 150 skilled, local technicians to maintain their projects for a minimum of 25-years.

4.14. The County Council is working with all energy companies and the New Anglia LEP to promote this sector and develop a Skills Strategy for the types of skills required for young people in schools and colleges. In addition, the County

Council is working to create:

- Apprenticeships,
- Work experience; and
- Internship opportunities at an appropriate stage.

4.15. Vattenfall has included a Skills and Employment Strategy Planning Condition/ Requirement within the Boreas DCO, ensuring that there is a skills legacy to the project. A similar requirement has been included in the Norfolk Vanguard DCO after discussion with the County Council at the Examination Hearings earlier in the year.

Comment

4.16. The County Council welcomes the inclusion within the draft DCO of a Planning Requirement, which will ensure that a Skills and Employment Strategy is prepared. Notwithstanding this the County Council should continue to work pro-actively with Vattenfall to demonstrate the economic benefits of using the Port facilities at Great Yarmouth for:

- Construction; assembly and manufacture of windfarm components; and
- Operations and maintenance.

The County Council should also continue to work with the applicant to develop the creation of apprenticeships; work experience and internships.

Wider Community Issues and Impact on Business

4.17. The agreed position in the Statement of Common Ground at the end of the Norfolk Vanguard examination on this topic was: “Norfolk Vanguard Ltd. is committed to exploring options for delivering a provision for communities, with the aim of recognising hosts and accounting for change, where benefits acknowledge and address tangible local change. The form of the benefit and its purpose will be explored with relevant stakeholders at the appropriate time, separate to the DCO process.” This same commitment will be made by Norfolk Boreas.

4.18. The reduction in the potential impacts and disruption to business as a consequence of using HVDC technology is welcomed, however, it is felt that Vattenfall should commit to providing appropriate compensation for businesses and communities adversely affected by the construction works.

Commercial Fishing

4.19. While commercial fishing is an offshore issue, it is considered appropriate to comment on the impacts the above proposal may have on this sector as Norfolk is home to many commercial fishing activities from its numerous ports and landing areas (i.e. potential economic issue).

4.20. The ES considers the impact of the proposed windfarm and ancillary infrastructure (offshore cable route; substations; convertor stations and accommodation blocks) on the commercial fishing sector. The type of fishing

carried out in the Array area principally comprises:

- Local UK Static gear Fishing potting by UK vessels (i.e. for brown crab, lobster and Whelk);
- Dutch Vessels undertaking trawling

4.21. The impacts arising are most likely during construction leading to temporary loss, or restricted access to, fishing grounds and leading to increased steaming times to alternative fishing grounds. However, the ES concludes that the impacts will largely be negligible in the longer term.

4.22. The ES also points out that the impact on commercial fishing has been reduced as a consequence of:

(a) Reducing the number of turbines to a maximum of 180; and

(b) Committing to using HVDC technology which uses fewer cable (on the seabed) thus reducing potential snagging issues of fishing gear.

4.23. In terms of mitigation and minimising impact, the applicant has indicated that they will include, for example:

- The provision of timely notices to mariners and the fishing community on any proposed works;
- Undertaking appropriate liaison with all relevant fishing interests; and
- Ensuring the layout of the windfarm minimises any future disruption to fishing in the area.

Comment

4.24. The County welcomes the revised/amended design of the above proposal and mitigation measures set out in the applicant's ES. However, where there is likely to be a demonstrable impact (i.e. during: construction; operation and/or decommissioning) on commercial fishing affecting communities in Norfolk, it is considered that Vattenfall should provide appropriate compensation (i.e. disturbance payments) to those fishing businesses affected. It is understood that Vattenfall are prepared to provide compensation in appropriate circumstances.

Local Highways

4.25. Detailed discussions and negotiations will remain on-going throughout the application process, particularly in respect of construction traffic management plans; and other travel related planning. Notwithstanding these ongoing discussions, officers have assessed the traffic implications arising from both scenarios as follows: -

Scenario 1 - Vanguard and Boreas are both delivered, and Vanguard installs ducts and carries out other shared enabling works prior to Boreas commencing.

For the main part, traffic impacts have already been assessed during the formal Norfolk Vanguard public hearings, which were conducted by the Planning Inspectorate. The only predicted additional highway impact relates to Boreas pulling cables through ducts that will have been installed by Norfolk Vanguard.

Phasing for the pulling of cables will be determined by the number of offshore phases. If two offshore phases are undertaken, the cables will be pulled through the ducts in up to two separate phases and the onshore project substation will also be constructed in up to two separate phases. Boreas will reuse Norfolk Vanguard accesses to the onshore cable route for cable pulling, including construction accesses and any retained/ reinstalled sections of running track. Cable drums will be delivered by HGV low loader to open joint pits and loaded onto a temporary hard standing. A winch is attached to the cable, pulling the cable off the drum from one joint pit to another, through the buried cable ducts. Cable jointing can be conducted once both lengths of electrical cable that terminate within a joint pit have been installed.

Comment - At this stage the traffic impact from the cable pull has not yet been assessed but it is not expected to be significant.

Scenario 2 Norfolk Vanguard does not proceed, and Boreas proceeds alone.

The main civil engineering works will take place first, which will comprise the installation of the cable ducts along the full length of the onshore cable route; after this, the electrical infrastructure (onshore cable pulling and substation plant) will be installed either in a single phase or in two separate phases. Under this scenario, the traffic impacts should be less than those already assessed by the Planning Inspectorate as part of the Vanguard project. This is because the duct installation generates the most traffic, but under this scenario less duct installation will be required – i.e. only ducting for Boreas rather than ducting for both Boreas and Vanguard. To ensure only one scenario is implemented, and that the relevant local authority have notice of which scenario is implemented, a requirement to this effect is included in the Development Consent Order.

Programme of works

The current indicative construction programmes anticipate that Norfolk Vanguard is expected to undertake pre-construction works in 2020 – 2021 with the main duct installation works taking place in 2022 - 2023. Under Scenario 1, Norfolk Boreas anticipates commencing construction in 2022 with operation and maintenance commencing in 2028/9.

Comment – Under Scenario 1 (Norfolk Vanguard proceeding) the County Council as Highway Authority does not have any additional comments to make to those made to the Norfolk Vanguard scheme and discussed at the Examination Hearings. However, in the event of Scenario 2 and the Boreas Scheme continuing as an independent project the County Council would need to repeat the concerns/issues raised to the Norfolk Vanguard scheme.

Public Health

4.26. The County Council would expect detailed matters relating to construction noise and local environmental health to be addressed by the relevant District Councils. Providing the District Councils are satisfied with the proposal in relation to the above matters, the County Council would not wish to raise any public health

concerns at this time.

4.27. **Flooding and Drainage**

4.28. The Boreas Project has provided a Non-technical Summary together with outline plans including an Outline Operational Drainage Plan. (8.21) and Environmental Statement Volume 1 - Chapter 20. These documents are still at high level, but mirror what has previously been submitted (i.e. included in the Preliminary Environmental Impact Report).

At this stage it has not been determined what method of discharging surface water will be utilised in the final design and no assessment of the current or proposed runoff rates has been undertaken. However, the aim will be to discharge surface water runoff as high up the hierarchy of drainage options as reasonably practicable, (that is: i) into the ground (infiltration); ii) to a surface water body; iii) to a surface water sewer, highway drain or another drainage system; or iv) to a combined sewer). Detailed infiltration testing will be undertaken in accordance with Buildings Research Establishment (BRE) Digest 365 Soakaway Design within the above ground operational areas. If infiltration is proven to be unfavourable, then Greenfield runoff rates for the site shall be agreed. The post development runoff rates will be attenuated to the equivalent Greenfield rate for all rainfall events up to and including the 1% annual probability (or 2 l/s/ha). **This approach laid out in the outline plan is acceptable to the LLFA.**

Comment

4.29. It is noted that the maximum land take areas for the construction of the project substation and National Grid (NG)substation extension and the permanent footprint of the NG substation extension have increased, **which must be accounted for in any drainage calculations.**

It is also noted at for trenched crossing locations the cable will be buried a minimum of 1.5m below the bed level, as opposed to 2m in the trenchless crossing scenarios. **Clarification of this minimum depth is required.**

It should be noted that where the proposals involve works to any ordinary watercourse (temporary or permanent) a consent will be required. The number of these, where applicable, should be determined and applications **for block, or phased consents should be made to the appropriate authority**, including the flood and water management team at Norfolk County Council or the Internal Drainage Board. Also, a number of access routes will need to cross existing ditches and watercourses and environmental permits and consents are likely to be required for each crossing point.

All issues previously raised in the comments sent to the applicant in respect of the pre-application consultation in November 2018 still apply.

All the above matters should be addressed by the applicant and covered through appropriate Planning Conditions / Requirements. It is understood that as part of the submitted DCO, Planning Requirements are set out which would enable the

above matters to be resolved post consent through:

(a) An agreed Operational Drainage Plan to be agreed with the County Council as LLFA and the Environment Agency;
(b) Code of Construction Practice with specific reference to surface water drainage; and
(c) Water Course Crossing requirements.

Subject to the inclusion of these Requirements in the final DCO, the County Council does not have any objection to the proposal in terms of surface water drainage matters.

5. Discharge of Requirements

5.1 As part of the application process there will be a need for a series of planning requirements attached to the final consent (Development Consent Order) covering a range of detailed matters. In the event that the DCO is consented these planning "requirements", will ultimately need to be discharged as the development progresses. The discharge of requirements is normally undertaken by the determining authority (i.e. local planning authority - LPAs) for non-NSIP schemes. For NSIP schemes there is the potential for the discharge of conditions/requirements to be undertaken by either the District Councils (LPAs) and/or the County Council.

Comment

5.2 It is understood through discussions on the Norfolk Vanguard project DCO that each local authority discharges those requirements within their respective area/ statutory remit, for consistency the Norfolk Boreas DCO should follow the same approach to the discharging of conditions. It is also understood that the applicant is prepared to fund the above "discharging" work given the significant resource implication. The discharge of requirements and their funding is expected to be covered through a Planning Performance Agreement (PPA).

6. Conclusion

6.1. Norfolk County Council fully supports the principal of offshore wind energy, which is consistent with national policies on energy particular in respect of:

- Reducing greenhouses;
- Providing energy security; and
- Maximising economic opportunities.

6.2. The above report shows that while the County Council supports the broad principal of this development proposal, there are still outstanding Highway issues that need to be resolved.

6.3. In addition to these issues there are wider strategic matters which need to be addressed and explored through the DCO process in order to maximise the potential socio-economic benefits, including:

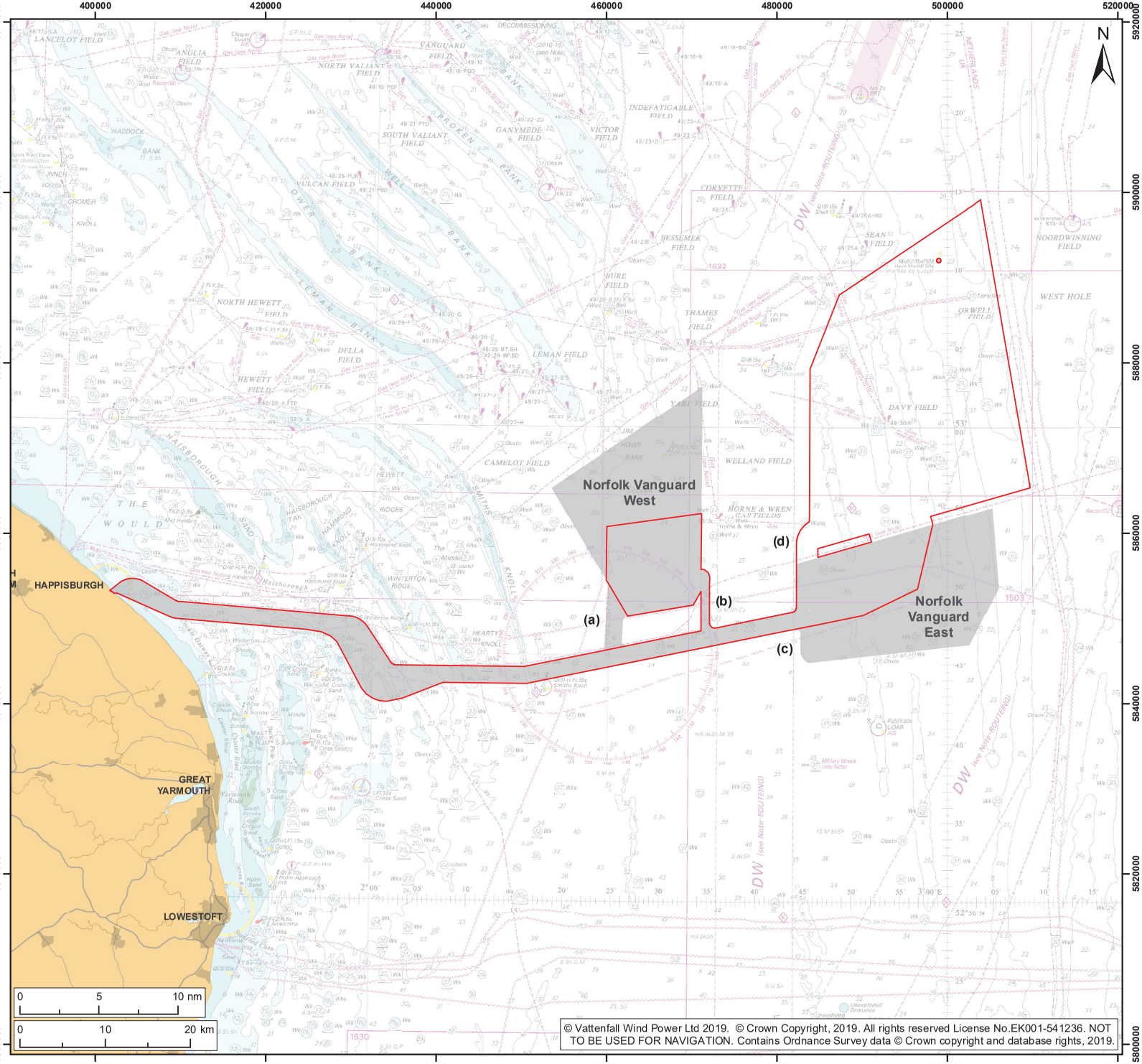
(a) Wider consideration to the need and possibility for secondary interconnection, which would allow for electricity generated from the

offshore wind farm to be used within the local distribution networks along the cable route;

(b) Economic benefits – use of ports in Norfolk:

- During the construction and assembly phase;
- As a location for basing operation and maintenance facilities; and
- As venues for seeking to attract manufacturing investment.

6.4. The County Council continues to work with Vattenfall in order to resolve the above issues.



Legend:

- Norfolk Boreas Order Limits
- Norfolk Vanguard Order Limits

Project:	Report:
Norfolk Boreas	Inter-relationship Report

Title:

Overlay of the Norfolk Boreas and Norfolk Vanguard offshore Order limits

Figure: 1 | Drawing No: PB5640-007-006-003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	23/05/2019	JT	JT	A3	1:450,000
01	22/05/2019	LB	DT	A3	1:450,000

Co-ordinate system: ETRS 1989 UTM Zone 31N **EPSG:** 25831

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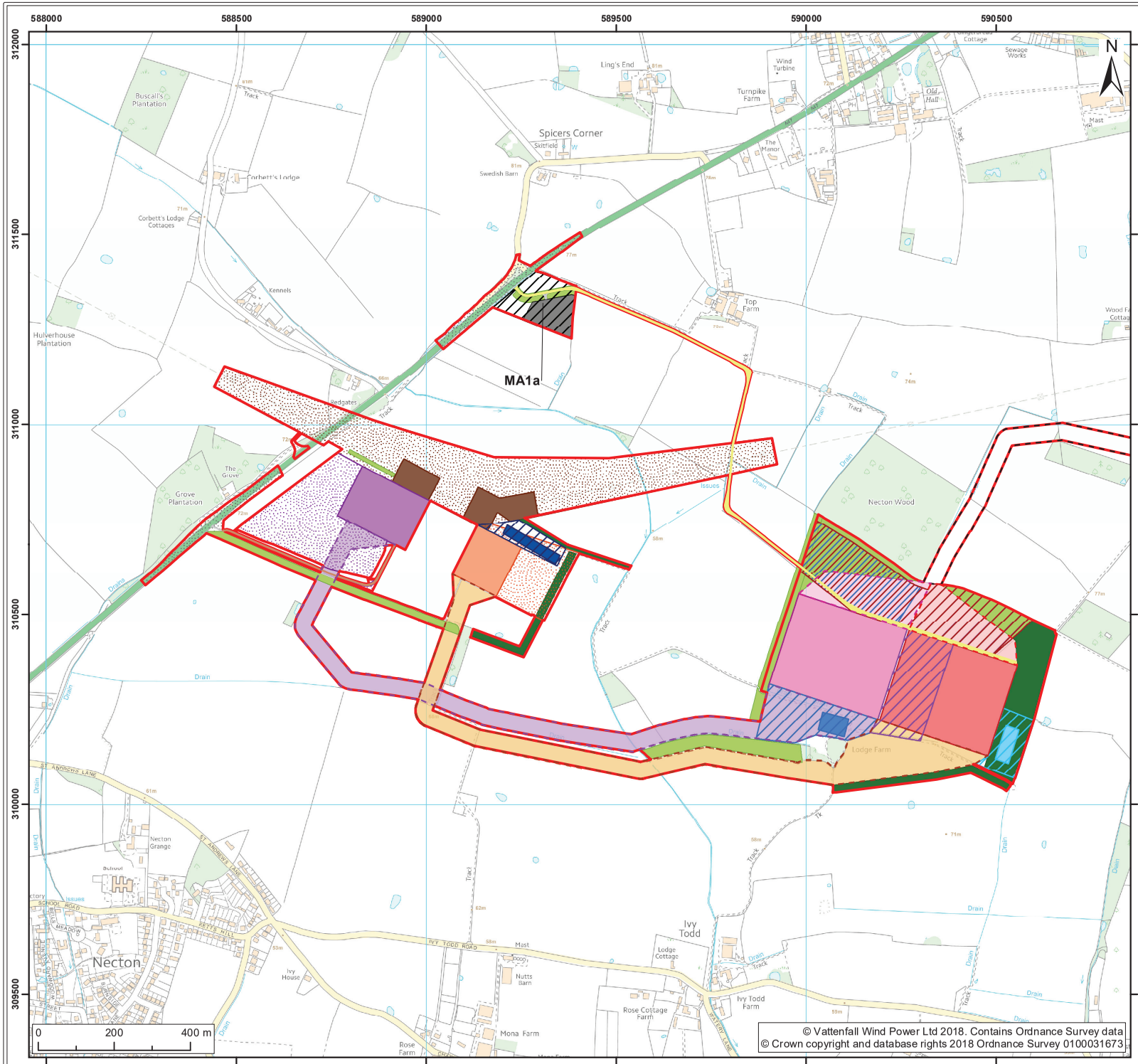

Legend:

- Norfolk Boreas Order Limits

Shared Norfolk Boreas and Norfolk Vanguard Infrastructure and Temporary Works Areas

- Onshore cable route
- Shared permanent access route
- Construction access
- Operational access
- Onshore project substation temporary construction compound zone
- Mobilisation zone
- Indicative mobilisation area compound
- National Grid temporary works
- National Grid attenuation pond location search area
- Indicative National Grid attenuation pond

Norfolk Boreas Infrastructure

- Norfolk Boreas onshore project substation
- Cable route entry to substation
- Onshore 400kV cable route
- National Grid substation extension (east)
- National Grid temporary works
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting

Norfolk Vanguard Infrastructure

- Norfolk Vanguard Onshore project substation
- Onshore project substation temporary construction compound zone
- Cable route entry to substation
- Onshore 400kV cable route
- National Grid substation extension (west)
- National Grid new/replacement overhead line tower search area
- Overhead line temporary works
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- Highways temporary works area

Project:	Report:
Norfolk Boreas	Inter-relationship Report

Title:

Overlay of Norfolk Boreas (Scenario 1) and Norfolk Vanguard infrastructure at the Onshore Project Substation and for the National Grid extension and overhead line works

Figure: 3 | Drawing No: PB5640-007-006-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	23/05/2019	JT	CD	A3	1:10,000
03	22/05/2019	LB	CD	A3	1:10,000

Co-ordinate system: British National Grid **EPSG:** 27700

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Covering Report

Report title:	**Norfolk Boreas Offshore Windfarm Consultation**
Date of meeting:	**Urgent Decision**
Responsible Chief Officer:	**Tom McCabe - Executive Director, Community and Environmental Services**

Strategic impact

The above offshore windfarm and onshore grid connection infrastructure will be determined as a Nationally Significant Infrastructure Project under the Planning Act 2008. Norfolk County Council is a statutory consultee on such projects and therefore has the opportunity to comment and influence the final decision. Responding to such consultations will ensure the County Council's views are formally taken into account prior to a final decision being made by the Secretary of State.

Executive summary

Consultation by Vattenfall (Swedish Energy Company) for an offshore wind farm 73km off the Norfolk coast comprising: up to 200 turbines; and ancillary onshore supporting infrastructure including: buried cable route (approximately 60 km); extending the existing sub-station at Necton; and construction of a new sub-station (close to Necton Sub-station). The proposal has a generating capacity of 1.8 Giga Watts, which is sufficient to provide 1.3 million homes with electricity. Given the scale of the development it is deemed to be a Nationally Significant Infrastructure Project (NSIP) and will be determined by the Secretary of State for Business, Energy and Industrial Strategy.

This is a formal pre-application consultation under Section 42 of the Planning Act 2008. There will be a further opportunity to comment on this proposal when the application is formally submitted under Section 56 of the Act.

Norfolk Boreas has a "sister project", called Norfolk Vanguard, which is approximately one year ahead of Norfolk Boreas in its development. In order to minimise local impacts a strategic decision was made early on to co-locate, or 'share' as much of the infrastructure with Norfolk Vanguard. This would allow Norfolk Vanguard to undertake some work which would be common to both projects thereby reducing environmental impacts.

Much of the key infrastructure relevant to Boreas will be delivered through the Norfolk Vanguard project. However, in the event Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone it would need to install all onshore infrastructure as an independent project.

Recommendations:

It is recommended that the County Council supports the principle of this offshore renewable energy proposal, which is consistent with national renewable energy targets and objectives, subject to the detailed comments raised below being resolved with the Applicant.

It is recommended that the detailed comments set out in the report and appendix 2 are endorsed by the Chair and Vice Chair of the Environment, Transport and Environment Committee.

1. Proposal – Facts and Figures

1.1. This proposal for an offshore windfarm and onshore ancillary grid connection infrastructure in Norfolk will be determined by the Secretary of State for Business, Energy and Industrial Strategy (Greg Clark) as it is defined as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. This is a formal pre-application consultation by Vattenfall under Section 42 of the above Act. It is important to note that the County Council as a statutory consultee will also have an opportunity to formally comment on the submitted Development Consent Order (DCO) application (under Section 56 of the above Act), which is expected in Summer 2019.

1.2. At this Section 42 stage the County Council is invited to make comments on the Preliminary Environmental Information Report (PEIR), made in support of the proposal. The PEIR presents the findings of the Environmental Impact Assessment (EIA) to date.

1.3. Members will be aware of the Norfolk Vanguard proposal which was brought to the Environment, Development and Transport (EDT) Committee in September 2018 and is the "sister" project to this Norfolk Boreas project. The Norfolk Vanguard proposal was supported at ETD Committee on 09 September 2018 subject to detailed matters being resolved. In addition members will be aware that there is separate offshore proposal being taken forward by the Dutch developer Orsted, for a larger offshore Wind Farm (Hornsea Project Three). The Hornsea project was reported to EDT in July 2018 and was supported subject to detailed matters being resolved.

1.4. If both the Norfolk Vanguard and Norfolk Boreas projects secure consent and progress to construction, the advantages of shared infrastructure will be realised. However, the Norfolk Boreas project needs to consider the possibility of the Norfolk Vanguard project not being built. In order for Norfolk Boreas to be considered as an independent project by the Planning Inspectorate, this scenario must be provided for within the Norfolk Boreas DCO application. Therefore, there are two scenarios which are considered within the PEIR:

- **Scenario 1** - Norfolk Vanguard proceeds to construction, and installs ducts and other shared enabling works for Norfolk Boreas. This scenario is optimal and the most probable outcome.
- **Scenario 2** - Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. The Norfolk Boreas EIA will also consider associated constraints and opportunities, under Scenario 2.

1.5. The Norfolk Boreas project comprises: offshore wind turbines, offshore electrical platforms, an offshore accommodation platform, offshore export cables, array cables, cables connecting the project with the Norfolk Vanguard project, landfall, onshore cables, an onshore project substation and an extension to the existing National Grid substation at Necton, including associated overhead line modification works.

1.6. The table below shows which elements would be included under Scenario 1 and which would be included under Scenario 2.

Offshore elements	**Scenario 1 Both projects go ahead**	**Scenario 2 Boreas only**
Landfall		

Landfall compounds	✓	✓
Transition pits	✓	✓
Cable pulling	✓	✓
Onshore Cable Route		
Pre-construction works	✓	✓
Cable duct installation via open cut trenching	x (Installed by Norfolk Vanguard)	✓
Cable duct crossings (e.g. hedgerows, underground services, roads or tracks, watercourses)	x (Installed by Norfolk Vanguard)	✓
Trenchless crossings (e.g. by underground drilling) and associated areas to drill from	x (Installed by Norfolk Vanguard)	✓
Mobilisation areas	x (Not required)	✓
Running track for construction vehicles to move along the route	✓ (approx. 12km)	✓ (approx. 60km)
Construction of accesses to the cable route	✓	✓
Cable pulling	✓	✓
Cable logistics area for storage of cables and machinery	✓	✓
Construction of underground cable jointing pits	✓	✓
Onshore Project Substation		
Pre-construction works	✓	✓
A47 junction improvement	x (Installed by Norfolk Vanguard)	✓
Access road to onshore project substation	✓ (Extension of road installed by Norfolk Vanguard by approx. 125m)	✓ (approx. 1.8km)
Construction of onshore project substation	✓	✓
Screening	✓	✓
National Grid Substation Extension and Overhead Modifications		
Pre-construction works	✓	✓
Extension to existing Necton National Grid Substation	✓ (easterly direction)	✓ (westerly direction)
National Grid Overhead line modifications	x (Installed by Norfolk Vanguard)	✓
Screening	✓	✓

1.7. If Norfolk Vanguard is approved and progresses as set out in Scenario 1 above the following infrastructure will be required to deliver the Norfolk Boreas project:

(a) Offshore

Location and Distance Offshore	:	Located in one distinct area approximately 73 km respectively off the Norfolk coast (see Maps attached).
Total Site Area		725 sq.km.
Proposed Capacity	:	Installed capacity of 1.8 Giga-Watt (sufficient to supply 1.3 million households with electricity).
Number and size of turbines	:	Range between 90 x 20MW to 200 x 9MW turbines with a maximum tip height of up to 350 metres
Offshore works	:	Interconnector Cables and foundations:
	:	Up to four cables to landfall totalling 500 km (400 within the offshore cable corridor and 100 within the Norfolk Boreas site).
	:	Up to 2 Offshore electrical (sub-station) platforms and 1 accommodation platforms. Maximum size 35,000 sq.m. per platform and maximum height of up 100 m.

(b) Onshore Work

Landfall Location	:	Immediately south of Happisburgh (1.5 km zone identified - see Maps attached) – all associated infrastructure will be located underground.
Cable route		Buried cable route between Happisburgh and grid connection at Necton Substation – approximately 60 km (See Maps attached). Up to 4 cable trenches will be required along an identified 45 m search corridor. The eventual corridor to be submitted with the application (S56) will be 100 m sufficient to accommodate both the Vanguard and Boreas projects in one duct laying operation. The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.
Necton - National Grid Sub-station (Extension)	:	The existing Necton National Grid substation (140 m x 145 m) would require an extension to accommodate the Norfolk Vanguard and Norfolk Boreas connection points (see Map): • Easterly extension 130 m; • Westerly extension 200 m • Maximum height 15 m. The extension would take the existing sub-station from 20,300 sq.m. to 65,250 sq.m. (tripling the size). The above works would be sufficient to facilitate both the Vanguard and Boreas Projects.
Necton - New Sub-	:	The new onshore substation will be required with a total maximum land requirement to the perimeter

station Boreas Project HVDC Convertor		fence of 250m x 300m (75,000 sq.m.); Maximum building height 19 m (HVDC); Plus temporary construction area 200 m x 100 m (20,000 sq.m.); The proposed substation will be located near to the Necton National Grid Substation – see Map attached. This is in addition to a similar size sub-station needed for Norfolk Vanguard project.
Overhead Line Modifications	:	Two new overhead line towers would be required in close proximity to the existing corner tower (to the north east of the existing Necton substation) with a maximum height of 55m. The existing corner tower would be demolished such that the net new number of towers is one. Alternatively, the existing corner tower could be modified and one new terminal tower constructed in close proximity. The design approach taken will be confirmed at the detailed design phase. The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.
	:	Construction time approximately 24-30 months for sub-station and pylon work (this includes groundworks and civil construction elements).
Ancillary Works	:	The onshore work will require, *inter alia*: Construction compounds (see Map)– i.e. support buildings private road and hard standing; Construction of temporary haul roads and access tracks along the onshore cable route; Archaeological and ground investigation; Improvements to highway verges; Highway and private access roads; Works to move sewers, drains; and cables; Works affecting non-navigable rivers, streams or water courses; Landscaping and other works to mitigate any adverse effects of the construction; operation, maintenance or decommissioning of the project including ecological monitoring and mitigation works.
	:	Construction timetable for above onshore works: • The pre-construction works for the onshore cable route would have been completed by Norfolk Vanguard and commencing in 2022 • There are two programmes for installing landfall duct installation - the preferred option is to do them after Norfolk Vanguard in 2024 and 2025.

		There is however a potential for option for them to be installed at the same time as Vanguard. • The cable pulling is scheduled for 2026 to 2027 • Offshore project substation to be completed in two phases by 2026-2027 • The National Grid substation extension works are likely to run in parallel to the onshore project substation works, commencing with pre-construction works in 2022.

1.8 In the event Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Under this scenario, Norfolk Boreas would install all onshore infrastructure as an independent project, including duct installation, all enabling works and modification to the existing overhead lines at Necton National Grid substation. The full list of infrastructure required for the Norfolk Boreas as an independent project is shown in Appendix 1.

1.9 The PEIR states that in response to feedback form the Norfolk Vanguard consultation exercise the decision has been taken to use High Voltage Direct Current (HVDC) technology. This decision removes the requirement for a cable relay station/s in North Norfolk and decreases the working width of the onshore cable corridor from 50m to 35m. The 35m corridor is for Norfolk Boreas and scenario 2, for Norfolk Vanguard and Norfolk Boreas the corridor is 45m which will be installed by Norfolk Vanguard. Thereby reducing potential impacts along the cable corridor. The Norfolk Boreas project is committed to using HVDC technology.

2. Evidence

2.1. The principal role of the County Council in responding to the above wind farm proposal, and the onshore infrastructure requirements, will be in respect of the Authority's statutory role as:

- Highways Authority;
- Minerals and Waste Planning Authority;
- Lead Local Flood Authority; and
- Public Health Responsibilities.

2.2. In addition the County Council has an advisory environmental role and economic development function, which also needs to feed into any response made to the above windfarm proposal.

2.3. Other statutory consultees include:

Natural England	Highways England
Historic England	Drainage Boards
Marine Management Organisation	Public Health England
Maritime and Coastguard Agency	Energy and utility companies with cable and pipeline interests
Civil Aviation Authority	Parish, District and other County Councils

2.4. The remainder of this section of the report assesses the PEIR in respect of the County Council's key functions and sets out the Authority's proposed response / comments. The response largely relates to the onshore infrastructure required to connect the electricity generated to the National Grid.

ASSESSMENT of the Preliminary Environmental Information Report

Overview

2.5. The proposal has a maximum capacity of 1.8 Giga Watts (1,800 MW) of electricity, sufficient to power approximately 1.3 million households (i.e. this represents more than three times as many dwellings in Norfolk (2011)). Current operational offshore capacity in the UK is just over 4 GW (2015), therefore if consented the Norfolk Boreas proposal would potentially increase the UK's installed capacity by 33%.

2.6. The proposal will generate thirty times more energy than the Scroby Sands wind farm (60 MW) and more than five and half times more energy than the Sheringham Shoal wind farm (317 MW). As such the proposal would make a serious contribution to the Government's Renewable Energy targets and objectives (see Section 5 below).

2.7. The PEIR has taken into account the cumulative impacts arising from both the Norfolk Vanguard (sister project) and the Hornsea Project Three offshore Wind Farm Projects in its assessment,

Comment

2.8. The principle of this offshore renewable energy proposal is supported as it is consistent with national renewable energy targets and objectives, subject to the detailed comments below being resolved with the applicant.

Grid Connection and Electricity Supply Issues

2.9. As indicated above the decision was taken to use High Voltage Direct Current (HVDC) technology. This decision removes the requirement for a cable relay station and decreases the working width of the onshore cable corridor from 50m to 35m, thereby reducing potential impacts along the cable corridor.

2.10. Grid connection is proposed at Necton and would involve, as indicated above, a significant extension to the existing sub-station taking it from just over 20,000 sq.m to over 65,000 sq.m (total footprint with the Norfolk Vanguard Project). In addition there would be the need for a new substation for both the Norfolk Vanguard and Norfolk Boreas projects comprising a further 75,000 sq.m each. There would also be a need for up-grading the power lines comprising a new tower (worst case scenario).

2.11. Members will be aware that County Council officers have been in discussion with Vattenfall and other potential offshore windfarm developers regarding the potential for electricity generated from these proposals to be used within the local distribution networks (132 kv and below) i.e. to assist where there are electricity deficits. These discussions have also involved National Grid who have made a formal and legally binding grid connection "offer" to Vattenfall.

2.12. National Grid have indicated that the onshore cables from the wind farms will ultimately belong to a future Offshore Transmission Operator (OFTO). In such circumstances, where the main connection point for the OFTO system is at a transmission substation (National Grid), the regulatory arrangements governing

OFTO infrastructure do not provide for secondary interconnection between the OFTO system and a local distribution network operator (DNO)(i.e. UK Power Networks). In other words there is no opportunity of “tapping” into the transmission cables and feeding into the local electricity transmission network.

2.13. There have been on-going officer and member discussions/meetings with both Vattenfall and Orsted (Formerly DONG Energy) regarding the potential impact on the County’s infrastructure. As part of these discussions officers have sought assurances that there will be as much practical collaboration between the two companies as possible in order to minimise any environmental impact on the County. However, in practice the opportunities for collaboration will be minimal given that grid connection points and landfall sites are being made in separate locations, and both companies are operating in a competitive market. Notwithstanding these issues Vattenfall and Orsted are working together in respect of:

(a) Where each project’s transmission cables cross;

(b) Stakeholder engagement; and

(c) Environmental data and survey work.

Comment

2.14. The County Council welcomes the decision by Vattenfall to pursue a HVDC solution which removes the need for additional onshore infrastructure (cable relay station) in North Norfolk and reduces the potential environmental impact associated with the cable route by narrowing the cable corridor from 100m to 45 m.

2.15. It is felt that Vattenfall should work with National Grid and UK Power Networks to consider options regarding the potential to feed electricity into the local transmission networks.

In addition the County Council will continue to work with the Local Enterprise Partnership (LEP) through the TRI - Local Energy Strategy (endorsed by this Committee in July 2018), in order to lobby central government to make legislative changes to overcome the obstacles to secondary inter-connection raised above.

Socio-Economic Issues

2.16. There are potentially significant economic benefits that may arise from the Boreas proposal in terms of:

- Local employment creation;
- Business sectors affected by construction; and
- Operations and Maintenance (O&M) of the wind turbines.

2.17. County Council officers have had good engagement with Vattenfall in terms of maximising the wider economic benefits from the project. The County Council fully expect and would support the longer term operations and maintenance benefits to be experienced locally. In addition the County Council would be keen for the project to enable/encourage manufacturing to be attracted to Norfolk. Discussion to date with Vattenfall would suggest that they are looking to develop not just an O&M presence in the County but also a manufacturing base. The PEIR suggests that the Norfolk Boreas and Norfolk Vanguard projects will in total create up to 481 jobs during construction and up to 175 jobs during operation.

2.18. The County Council is working with all energy companies and the New Anglia

LEP to promote this sector and develop a Skills Strategy for the types of skills required for young people in schools and colleges.

In addition the County Council is working to create:

- Apprenticeships,
- Work experience; and
- Internship opportunities at an appropriate stage.

2.19. It is felt that the given the scale of this proposal and potential disruption it may cause to local communities and business that there should be suitable local community benefits arising and appropriate compensation for local businesses.

Comment

2.20. The County Council strongly welcome, on economic development grounds and supporting the Norfolk economy Vattenfall's decision to use the Port facilities at Great Yarmouth for:

- Construction; assembly and manufacture of windfarm components; and
- Operations and maintenance.

2.21. Vattenfall should set out clearly in the following application stage (Section 56 submission) and the accompanying Environmental Statement (ES):

(a) how local communities impacted by the onshore construction (e.g. Cable Route, CRS and Substation) can have such impacts mitigated; and

(b) the need for a "local community fund" to assist the wider community affected by the proposal.

2.22. Vattenfall should, given the potentially long timescales for construction address the cumulative impact/s on local businesses and communities and provide appropriate compensation for those businesses and communities adversely affected by the construction works.

Commercial Fishing

2.23. While commercial fishing is an offshore issue it is considered appropriate to comment on the impacts the above proposal may have on this sector as Norfolk is home to many commercial fishing activities from its numerous ports and landing areas (i.e. potential economic issue).

2.24. The PEIR considers the impact of the proposed windfarm and ancillary infrastructure (offshore cable route; substations; convertor stations and accommodation blocks) on the commercial fishing sector. The type of fishing carried out in the Array area comprises:

- Local UK Static gear Fishing potting by UK vessels (i.e. for brown crab, lobster and Whelk);
- Dutch Vessels undertaking trawling

2.25. The PEIR indicates that fishing will be permitted within the Norfolk Boreas project area following construction and therefore much of the current activity will be able to recommence during operation of the wind farm. The PEIR does, however, accept that there could potentially be a significant impact during the construction phase on those UK vessels using static gear. As such Vattenfall have indicated that where necessary appropriate mitigation could be arranged.

Comment

2.26. It is felt that where there is likely to be a demonstrable impact on commercial fishing affecting communities in Norfolk that Vattenfall should provide

appropriate mitigation and compensation to those fishing communities affected.

Local Highway Issues

2.27. The PEIR presents the potential traffic and transport considerations, with the construction phase identified as generating the greatest number of vehicle movements. In turn, cable installation represents the maximum construction intensity with the onshore cable works programmed for a two year period (2026 – 2027).

Highway Comment 1

2.28. The PEIR indicates the delivery of materials and plant to the cable installation locations could occur between 7am and 7pm. This goes against a recommendation that excessive deliveries should be avoided at traffic sensitive times on some key routes. This will need to be clarified.

In order to minimise traffic impacts during construction, the developer wishes to undertake enabling works for two projects (Boreas and Vanguard) at the same time. The PEIR considers two scenarios (i) Norfolk Vanguard proceeds and installs ducts for both projects and Scenario (ii) Vanguard does not proceed – in which case Boreas is taken forward as an independent project.

Highway Comment 2

2.29 Assessing the impact in this manner is appropriate.

The anticipated volume of construction traffic upon each route is contained within the PIER. This also includes HGV traffic using Great Yarmouth Port as an additional potential port if required. The PEIR indicates that the Environmental Statement (ES), when submitted, will incorporate a more detailed Transport Assessment (TA).

Highway Comment 3

2.30 In the meantime, the methodology used to date is acceptable.
A Construction Traffic Management Plan (CTMP) and a Travel Plan (TP) will be submitted in outline as part of the Development Consent Order (DCO) and then completed and agreed when the contractor is appointed. The DCO will contain a commitment to trenchless crossing to the A47; A140 and A149. The DCO will also contain a commitment to undertake pre-condition surveys of all routes so that any damage can be identified during the works and rectified by the developer.
A number of adverse impacts have been identified to pedestrian amenity, with the worst case scenario assuming the construction of all infrastructure components is undertaken concurrently. The applicants have identified mitigation measures to reduce the impact.

Highway Comment 4

2.31 The CTMP needs to contain a specific commitment to managing HGV movements on any specifically identified adverse links.
Post opening of the NDR, traffic flows have increased on the A1067. To inform the DCO submission, a survey of traffic flows will be undertaken during peak hours and an appropriate crossing method will be agreed.

Upon completion, the onshore project substation will not be manned, however access will be required periodically for routine maintenance activities, estimated at an average of one visit per week.

Cumulative Impact
A key issue for the County Council relates to the use of the former Oulton airfield as a compound. This is because the access route will be used by three different wind farm projects, in particular by Orstead for their project.

2.32 **Highway Comment 5**
The developer still needs to confirm cumulative impacts arising from all three wind farm projects utilising the same access route to the compound at Oulton. The County Council, as LHA is working closely with the applicant on the above matters. In the meantime we wish to raise a holding objection until they have been satisfactorily addressed.

Wider Strategic Highway Issues

2.33 Members will be aware of proposals to dual the A47(T) between Easton and North Tuddenham. Highways England have announced a preferred route for the A47(T). Proposals for the dualling of the A47 (T) will follow the same NSIP procedures as the above application. While there are no immediate plans to dual the A47(T) in the Necton area, it is felt that the above proposal should not fetter any long terms possibilities for the dualling of the A47 in the area.

2.34 The applicant will need to liaise with both Highways England and Norfolk County Council (as LHA) to ensure that the planned cable route does not fetter any future major road plans in the area and cause additional costs and/or delay to such road schemes.

(a) Vattenfall need to satisfy Highways England with regard to the safety of their proposed access at Necton onto the A47(T). Impact upon driver delay along the trunk road network will also be assessed by Highways England.

(b) Vattenfall should work closely with Highways England and Norfolk County Council (Highway Authority) to ensure the proposed cable route does not fetter any future plans for the dualling of the A47(T);

(c) Vattenfall are asked to ensure that their underground Cable Route does not fetter any future highway improvement schemes in Norfolk and that where any reinforcement or diversion is needed to the cable route as a result of such highway works, that Vattenfall will be responsible for any upgrades or diversion of the cables and will fully meet the costs of these works.

Minerals and Waste

2.35 Norfolk County Council in its capacity as the Mineral and Waste Planning Authority has been involved in discussions with Vattenfall about the Wind Power Projects; regarding mineral and waste safeguarding, both of sites and resources. Throughout the project preparation information has been exchanged between the parties regarding these safeguarding issues. The Mineral Planning Authority welcomes the recognition of mineral safeguarding issues, contained within the PEIR.

2.36 The Mineral Planning Authority considers that the PEIR correctly assesses the magnitude, sensitivity and significance of the effect of the project on Mineral Safeguarding Areas. The further mitigation suggested, in the PEIR is considered likely to be effective. Therefore, Norfolk County Council in its capacity as the Mineral Planning Authority does not object to the Proposed Boreas Wind Power Project provided that the applicant continues to work with Norfolk County Council regarding the mitigation of impacts on the Mineral Safeguarding Areas as the final scheme design continues.

Comment

2.37 It is felt that Vattenfall should continue to work closely with the County Council with regard to mineral and waste planning issues.

Flood and Drainage Issues and Comments

2.38 The Boreas Project has provided a PEIR containing several documents relating to the flood risk of the study area, including a water resources and flood risk document together with a water course crossing schedule and a Flood Risk Assessment (FRA).

2.39 The report indicates that the onshore project area will largely be located on rural, agricultural land where there are limited existing formal surface water drainage systems; however, there are a large number of agricultural land drains and ordinary watercourses, especially along the onshore cable route.

2.40 The Flood Risk Assessment and supporting documentation shows that the proposed development at present meets the requirements of the NPPF. At this stage it has not been determined what method of discharging surface water will be utilised in the final design and no assessment of the current or proposed runoff rates has been undertaken.

Comment

2.41 The County Council would wish to see that any drainage strategies contain maintenance and management plans detailing the activities required and who will adopt and maintain the surface water drainage features for the lifetime of the development. Further detailed comments relating to flood and drainage issues are set out in the Appendix 2.

Offshore Archeology

2.42 Chapter 17 of the PEIR provides baseline data about the historic environment implications of the offshore and inter-tidal sections of the cable route and infrastructure for the project. Only the inter-tidal archaeology covered by this chapter falls directly within the scope of what NCC Environment Service will comment on. The offshore archaeology lies within the remit of the MMO and Historic England, but we nevertheless maintain an interest in the results of the offshore survey and recording work.

2.43 Assessment of the inter-tidal archaeology at the Happisburgh landfall site, including a geotechnical survey, has been carried out in conjunction with the assessment for the Norfolk Vanguard project. Although the assessment has indicated that potential for significant Lower Paleolithic remains to be present is low, due to the presence of sinkhole feature, a methodology for inter-tidal archaeology is included with the offshore archaeology written scheme of investigation submitted as part of the PEIR.

2.44 **Comment**

Vattenfall/Norfolk Vanguard Ltd and their heritage consultants (Royal Haskoning

DHV) should continue to liaise with Norfolk County Council Environment Service, Historic England and other key stakeholders (e.g. AHOB) regarding the potential physical impact on, and appropriate mitigation strategies for, archaeological remains within the inter-tidal and offshore areas of the project.

Onshore Archaeology

2.45 Chapter 28 of the PEIR provides baseline data about the historic environment implications of the onshore cable route and its associated infrastructure. Two key aspects are considered; the potential indirect impact of the proposals on the setting of designated heritage assets - which is principally relevant to the construction and operation phases of the project - and the physical impact on undesignated heritage assets with archaeological interest – principally during the construction phase. Potential impacts during the decommissioning phase are also considered.

2.46 The onshore above-ground infrastructure for the project comprises a proposed substation at Necton. As the substation lies on a different footprint to that proposed for the Vanguard scheme, the PEIR chapter considers its potential impact on designated heritage assets (including scheduled monuments, listed buildings, conservation areas and designated parks and gardens) in the surrounding landscape. The PEIR concludes that there will be no adverse setting impacts on any designated heritage assets.

2.47 As stated in the PEIR Chapter, the Boreas project will share an onshore cable corridor with Vattenfall's Vanguard OWF project, with the Boreas substation being located on a site close to the proposed Vanguard substation at Necton. The shared cable corridor means that the overall impact on the historic environment is minimised. The Norfolk Vanguard project is seeking consent to undertake the enabling works for both the Vanguard and Boreas schemes. Consequently, if the Vanguard project is consented, the onshore archaeological works for both Vanguard and Boreas will be undertaken as part of the Vanguard project, and carried out in accordance with the agreed archaeological written scheme of investigation submitted as part of the Vanguard DCO application.

2.48 However, the PEIR Chapter rightly identifies a possible scenario where the Vanguard project is not consented and the Boreas archaeological works are not undertaken as part of that scheme. Under these circumstances the archaeological works required for the Boreas project would be undertaken separately. The nature of the archaeological works would be largely the same as those already agreed for the Vanguard project and would be carried out in accordance with a written scheme of investigation to be submitted as part of the Boreas DCO application.

2.49 **Comment**

Vattenfall/Norfolk Boreas Ltd and their heritage consultants (Royal Haskoning DHV) should continue to liaise with Norfolk County Council Environment Service, Historic England and other key stakeholders (e.g. AHOB, National Trust) regarding the potential physical impact on buried and above-ground archaeological remains. It is requested that this includes discussion of archaeological written scheme of investigation for the proposed mitigation measures prior to the production of the full Environmental Statement for the DCO application.

Local Member Views

2.50 The local member for North Walsham East division (Cllr Seward) has made the following comments:

- Reiterate the comments made to North Norfolk District Council for the PEIR in relation to Vattenfall's Norfolk Vanguard proposal.
- Whilst accepting that there is no need to refer to relay stations (no longer a proposal) or concerns about one of the drilling options at the landfall site in Happisburgh as it is now "deep drill".
- Concerns about cliff erosion at the landfall site still of course remain.

2.51 The local member for Reepham division (Cllr Peck) has made the following comments:

- Both Vattenfall and Orsted are using sites close to Oulton as staging depots for vehicles and storage of cables, etc. Although Vattenfall will be there for a shorter period of time (two to three years?) compared to Orsted who will be there for entire length of project (8 to 11 years). We must consider the cumulative effect of all the traffic movements on narrow country roads. An application for an anaerobic digester was turned down on Oulton airfield due to Highways Dept objections to the site access and the movement of traffic on the narrow road into the village. Both Vattenfall and Orsted schemes on their own each create more traffic than the digester application. This will not only effect Oulton but also Cawston and other nearby villages, Salle, Heydon, etc. I would like to request NCC Highways object on the same basis that they objected to the digester application.

3. Financial Implications

3.1. Staff have engaged with the applicant at the technical scoping stage; attending steering group and topic based meetings and provided technical advice and information in respect of the County Council's statutory responsibilities. The County Council has charged for some of this advice and technical data provided.

4. Issues, risks and innovation

4.1. The County Council is a statutory consultee on any Nationally Significant Infrastructure Project determined by the Secretary of State within Norfolk or on the borders with Norfolk. The County Council will also be invited to submit a Local Impact Report (LIR), the content of which is a matter for the Local Authority and can include local transport issues and the local area characteristics.

4.2. The Council's Planning functions are subject to equality impact assessments. No EqIA issues have been identified at this stage.

4.3. The County Council's internal procedures allow for corporate response/s to be made to NSIP consultations ensuring all the County Council's statutory responsibilities are taken into account.

5. Background

5.1. At a national level the key energy objectives are:

- Reducing greenhouse gases (carbon reduction);
- Providing energy security; and
- Maximising economic opportunities.

In order to meet these objectives more infrastructure is required with an increased emphasis on energy generation from renewable and low carbon sources.

5.2. The government's long term aspiration is to increase the diversity of the electricity mix, thereby improving the reliability of energy supplies as well as lowering carbon emissions. The Government is committed to the following targets by 2030:

- A 40% cut in greenhouse gas emissions compared to 1990 levels;
- At least a 27% share of renewable energy consumption; and
- At least 27% improvement in energy efficiency.

5.3. The Energy Act 2013 includes provision intended to incentivise investment in low carbon electricity generation, ensure security of supply and help the UK meet its emissions reduction and renewable energy targets. The Climate Change Act 2008 underlines the government's commitment to addressing both the causes and consequences of climate change. The Act aims to improve carbon management and help the transition towards a low carbon economy in the UK. The Planning Act 2008 also makes specific reference to the need for local authorities to tackle climate change.

5.4. In terms of planning, the UK's commitment to renewable energy has been captured in the following National Policy Statements (NPSs):

- Overarching NPS for Energy (NPS EN 1);
- NPS for Renewable Energy Infrastructure (NPS EN 3);
- NPS for Electricity Networks Infrastructure (NPS EN 5).

The Planning Act 2008 requires the Secretary of State to have regard to the relevant NPSs when making their decision.

5.5. With regard to local planning issues the National Planning Policy Framework (NPPF 2012) indicates that the planning system has a key role in supporting the delivery of renewable and low carbon energy and associated infrastructure. To help increase the use and supply of renewable energy the NPPF (section 10) indicates, inter alia, that local planning authorities (LPAs) should:

- Have a positive strategy to promote energy from renewable and low carbon sources;
- Design their policies to maximise renewable and low carbon development;
- Consider identifying suitable areas for renewable development and supporting infrastructure.

5.6. As the above proposal is a NSIP it will be the Secretary of State (SoS) rather than the respective LPAs who will determine the application. The SoS will need to have regard to Local Plan policies and allocations when determining the application. The individual LPAs, including the County Council, are also statutory consultees in the NSIP process and will respond having regard to their Local Plan policies and other statutory responsibilities including environmental health (District Councils).

Background Papers

The Planning Act (2008)
(http://www.legislation.gov.uk/ukpga/2008/29/contents)
The National Planning Policy Framework (2012) -
https://www.gov.uk/government/publications/national-planning-policy-framework--2
Energy Act (2013)
http://www.legislation.gov.uk/ukpga/2013/32/contents/enacted/data.htm
Vanguard Proposal (2017)
https://corporate.vattenfall.co.uk/projects/wind-energy-projects/vattenfall-in-norfolk/norfolkvanguard/documents/preliminary-environmental-information-report/

Officer Contact

If you have any questions about matters contained in this paper or want to see copies of any assessments, eg equality impact assessment, please get in touch with:

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Appendix 1 – List of full infrastructure Norfolk Boreas would have to install as an independent project if Norfolk Vanguard does not proceed.

(a) Offshore

Location and Distance Offshore	:	Located in one distinct area approximately 73 km respectively off the Norfolk coast (see Maps attached).
Total Site Area		725 sq.km.
Proposed Capacity	:	Installed capacity of 1.8 Giga-Watt (sufficient to supply 1.3 million households with electricity).
Number and size of turbines	:	Range between 90 x 20MW to 200 x 9MW turbines with a maximum tip height of up to 350 metres
Offshore works	:	Interconnector Cables and foundations:
	:	Up to four cables to landfall totalling 500 km (400 within the offshore cable corridor and 100 within the Norfolk Boreas site).
	:	Up to 2 Offshore electrical (sub-station) platforms and 1 accommodation platforms. Maximum size 35,000 sq.m. per platform and maximum height of up 100 m.

(b) Onshore Work

Landfall Location	:	Immediately south of Happisburgh (1.5 km zone identified - see Maps attached) – all associated infrastructure will be located underground.
Cable route		Buried cable route between Happisburgh and grid connection at Necton Substation – approximately 60 km (See Maps attached). Up to two cable trenches will be required along an identified 200 m search corridor.
Necton - National Grid Sub-station (Extension)	:	The existing Necton National Grid substation (140 m x 145 m) would require an extension to accommodate the Norfolk Boreas connection points (see Map). The substation will be extended in a westerly direction to a total length of 340m (inclusive of the existing Necton National Grid substation) and will be a maximum height of 15m.
Necton - New Sub-station Boreas Project HVDC Convertor	:	The new onshore substation will be required with a total maximum land requirement to the perimeter fence of 250m x 300m (75,000 sq.m.); Maximum building height 19 m (HVDC); Plus temporary construction area 200 m x 100 m (20,000 sq.m.); The proposed substation will be located near to the Necton National Grid Substation – see Map attached.
Overhead Line	:	Two new overhead line towers would be required in close

Modifications		proximity to the existing corner tower (to the north east of the existing Necton substation) with a maximum height of 55m. The existing corner tower would be demolished such that the net new number of towers is one. Alternatively, the existing corner tower could be modified and one new terminal tower constructed in close proximity. The design approach taken will be confirmed at the detailed design phase.
	:	Construction time approximately 24 to 30 months for sub-station and pylon work (this includes groundworks and civil construction elements).
Ancillary Works	:	The onshore work will require, *inter alia*: Construction compounds (see Map)– i.e. support buildings private road and hard standing; Construction of temporary haul roads and access tracks along the onshore cable route; Archaeological and ground investigation; Improvements to highway verges; Highway and private access roads; Works to move sewers, drains; and cables; Works affecting non-navigable rivers, streams or water courses; Landscaping and other works to mitigate any adverse effects of the construction; operation, maintenance or decommissioning of the project including ecological monitoring and mitigation works.
	:	Construction timetable for above onshore works: • Pre-construction works commencing between 2021 - 2022; • Main works (duct installation, sub-station and cable relay station civil works) proposed for 2023 – 2024; • Completed by 2026 based on whole project built in longest three phase scenario;

Appendix 2 - Detailed Comments

Flood and Drainage Issues and Comments

The Boreas Project has provided a PEIR containing several documents relating to the flood risk of the study area, including a water resources and flood risk document together with a water course crossing schedule and a Flood Risk Assessment (FRA). Vattenfall Wind Power Limited (VWPL) (the parent company of Norfolk Boreas Limited) is also developing Norfolk Vanguard, a 'sister project' to Norfolk Boreas. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking to obtain consent to undertake enabling works for both projects at the same time. However, Norfolk Boreas needs to consider the possibility that Norfolk Vanguard may not proceed to construction.

The onshore project area considered at PEIR stage includes the following elements: Landfall; Onshore cable route, Onshore project substation; access routes and extension to the Necton National Grid substation and overhead line modification. The report has taken into account two scenarios as set out in paragraph 1.4-1.6.

The report indicates that the onshore project area will largely be located on rural, agricultural land where there are limited existing formal surface water drainage systems; however, there are a large number of agricultural land drains and ordinary watercourses, especially along the onshore cable route. More formal surface water drainage systems may be present in locations where the onshore project area passes in proximity to settlements or highways. The Project should consider the flood risk it could introduce and poses elsewhere as well as to the development itself. Risk to any nearby properties should also be considered – no reference to this was found in the submission.

The British Geological Survey (BGS) maps identify the bedrock underlying the onshore project area as Chalk to the west and Neogene and Quaternary Rocks to the east, overlain by superficial deposits of till (Diamicton), glacial sand and gravel, clay, silt and sand alluvium, and Crag Group (sand and gravel) throughout

Environment Agency flood zone maps (Environment Agency, 2012) (Figure 20.5) indicate that the majority of the study area is located within an area of low flood risk (Flood Zone 1). Flood Zone 1 is defined as land as having a less than 1 in 1,000 annual probability of river flooding (<0.1%). The onshore cable corridor is located within Flood Zones 1, 2 and 3 and the Happisburgh landfall location in land is located within Flood Zone 1 (although the beach is flood zone 3) as defined by the Environment Agency online Flood Map for Planning. All sources of flood risk have been explored. However, there are many ordinary watercourses within the proposal area and these also have a flood risk associated with them (equivalent to flood zone 2 and 3). These areas of risk are not shown on the Environment Agency Map as the catchments are smaller than 3km2 and are not included on the national map. The proposal should consider this local source of flood risk to ensure that all sources of flooding have been assessed.

The onshore cable corridor is located within three key hydrological catchments, and intersects significant watercourses at three key crossing points together with a number of other watercourses that are crossed. Additionally, there are a number of Internal Drainage Board (IDB) channels which cross the onshore project area. Furthermore, there are a large number of ordinary watercourses and agricultural drainage channels**.**

The applicant is suggesting in the FRA that (where necessary) trenchless crossing techniques will be used for the larger watercourse crossings (specifically the River Wensum, River Bure, King's Beck, Wendling Beck, and the North Walsham and Dilham Canal) - Paragraphs 4.2.2.5 – 89 and 4.2.3.5 – 119 of the FRA indicate that this will be by passing under watercourses at a minimum depth of 1.5m (however a depth of least

2m below the river bed is stated in the Water resources and Flood risk document – clarification is required)). However, the project also includes numerous trenched watercourse crossings within river water body catchments. Where the proposals involve works to any ordinary watercourse (temporary or permanent) a consent will be required. The number of these, where applicable, should be determined and applications for block, or phased consents should be made to the appropriate authority, including the flood and water management team at Norfolk County Council or the Internal Drainage Board.

For the cable route, a pre-construction Surface Water and Drainage Plan will be developed, agreed with regulators and implemented to minimise water within the cable trench and other working areas and ensure ongoing drainage of surrounding land.

Flood risk from surface water to the onshore project substation area and off-site as a result of the proposed project will be addressed through the development of a detailed drainage design.

Also a number of access routes will need to cross existing ditches and watercourses and environmental permits and consents are likely to be required for each crossing point. The methodology to be used for any temporary construction at crossing points over existing ditches and watercourses shall be agreed with the Environment Agency and relevant Local Authority as part of the Environmental Permitting (Amendment) Regulations 2018 process or as an Ordinary Watercourse Consent application. The National Grid substation extension and overhead line modifications are located within Flood Zone 1.However the greatest potential source of flooding to the National Grid substation extension is from surface water. Appropriate management techniques as discussed in the FRA should be a requirement.

The assessment states that during the temporary damming and re-routing of watercourses required during the construction of the onshore cable corridor, the original flow volumes and rates need to be maintained to ensure flood risk is not increased at the construction site and elsewhere.

Post-construction, watercourses should be reinstated to pre-construction channel depths and bank slopes as far as possible to ensure flood risk is not affected. Mitigation of the existing flood risk at key crossing points during the construction phase of the project will need to be managed. Any construction work located within Flood Zone 2 or 3, or within proximity to an ordinary watercourse should undertake suitable risk assessments, including the formation of site specific evacuation routes into areas of low flood risk. It is also advised that any temporary plant storage including potentially polluting substances e.g. oil storage is located above expected flood levels. On ordinary watercourses (where there are no formal flood warning systems in place) we suggest that the applicant consider signing up to available weather alerts from the Met office. This could help understand when significant rainfall may be expected and could go to provide onsite procedures to halt any works within watercourses to prevent an increased risk from in channel workings.

There are a number of groundwater SPZ (Source Protection Zone) areas within the onshore project area. Trenchless crossing techniques activities are proposed in these areas

It states in paragraph 7.3.1 -202 (Post construction), that following completion of the project the onshore cable corridor shall be located below ground level and as such would have no impact on surface water drainage. Temporary works and all access route surfacing shall be removed and would have no operational use. This risk of creating a ‘conduit’ should be considered when assessing any back fill materials to the trench, and how this could affect the local flow routes (i.e. changes to the permeability of the site). The surface water drainage requirements for the permanent compounds will be dictated

by the final drainage study.

The FRA states that the SuDS philosophy will be employed. It is proposed to limit post development off site run-off to the existing greenfield rate, where infiltration is not possible, by reducing rates and volumes of run off associated with the project during operation via the integration of effective surface drainage systems by providing sufficient on site attenuation for rainfall events up to 1 in 100 year rainfall event, plus a 20% allowance for climate change over the lifetime of the development (however that this is to be increased to 40% in the drainage design). However there is no assessment of the current and proposed runoff rates to determine the surface water attenuation requirements for the sites in line with The SuDS Manual (2015), which should indicate that the flow rate discharged from the sites must not exceed that prior to the proposed development for the 1 in 1 year event; 1 in 30 year event; and 1 in 100 year event. The sites have not yet been assessed against a 'greenfield' baseline, assumed to be 100% permeable surfacing. Further information should be requested to be provided at design stage.

The FRA and supporting documentation shows that the proposed development at present meets the requirements of the NPPF. At this stage it has not been determined what method of discharging surface water will be utilised in the final design (although changes in surface water runoff as a result of the increase in impermeable area from the onshore project substation and National Grid substation extension will be attenuated and discharged at a controlled rate) and no assessment of the current or proposed runoff rates has been undertaken. The drainage strategy will be developed according to the principles of the SuDS discharge hierarchy. The County would also wish to see that any drainage strategies contain maintenance and management plans detailing the activities required and who will adopt and maintain the surface water drainage features for the lifetime of the development.

Public Rights of Way (PRoW) and Norfolk Trails

Chapter 30 of the PEIR, describes how the onshore cable route interacts with PRoW. We agree with the baseline data presented and recognise that the cable route will interact with PRoW in the following ways:

- Twice with the Coastal Path, neither location will require a closure due to the use of HDD duct installation;
- Seven times with Norfolk Trails (long distance paths). Two of which may require temporary closure, and five would either require no action or a controlled crossing;
- Four times with Bridleways. Two of these will require no closure, one would require a controlled crossing, and one may need a temporary closure or diversion;
- Four time with cycle paths, none of which would require closure, diversion, or controlled crossings;
- 27 times with footpaths, 18 of which may require temporary closure or diversion and nine which would either require no closure or a temporary controlled crossing; and
- Once with a restricted byway which is only partially affected.

Comment

Chapter 30 of the PEIR, describes appropriate mitigation for impacts on PRoWs. As with the Vanguard project, mitigation for potential impacts will be addressed through an Outline Code of Construction Practice which will be agreed in consultation with NCC and all relevant stakeholders and submitted as part of the final DCO submission.

Ecology
The ecological baseline information provided in Chapter 22 of the PEIR for the Boreas project is essentially the same as that in the PEIR and DCO submission for the sister Vanguard project, although some additional ecological surveys are described that were undertaken in 2018. The Natural Environment Team are supportive of the approach taken with regards to ecology and agree the baseline data presented in the current PEIR is appropriate. It is noted that in some locations, survey access was not possible in either 2017 or 2018, and surveys in these areas will be required in due course.
Comment

As with the Vanguard project, some mitigation for ecology is embedded through design (summarised in Tables 22.22 and 22.23 of Chapter 22 of the PEIR) and some will be achieved through the Outline Landscape and Ecological Management Plan which will be submitted with the DCO submission. We are supportive of this approach.

Landscape
Norfolk County Council welcome the opportunity to be involved in the consultation regarding the landscape and visual amenity impacts.

It is noted that the LVIA has been carried out using methodology by OPEN which accords with the Landscape Institute GLVIA 3 guidance. Where the OPEN methodology diverges from the GLVIA 3 guidance, reasoned justification has been given. This is namely in choosing not to combine the magnitude of change rating for the size or scale of effect, its geographical extent and its duration and reversibility. The choice to not combine seems appropriate for the proposals and is well justified in the methodology. The study area has been defined as 3km radius from the outer edge of the onshore project substation and a 500m strip either side of the cable route and associated access and mobilisation areas. This appears a suitable study area and will be effective in assessing the potential landscape and visual impacts.

It is understood that two proposals are being considered for the EIA, the first where Norfolk Vanguard proceeds to construction and therefore Norfolk Boreas is able to use infrastructure already installed, and a second where Norfolk Vanguard does not progress and therefore Norfolk Boreas will need to undertake all works as required. The assessment also considers the Cumulative Impacts of potential other projects including the National Grid substation extension and the Hornsea Project.
The viewpoint assessment includes a number of visualisations which accord with SNH's Visual Representation of Wind Farms Version 2.2 2017, which is endorsed by the Landscape Institute and considered the preferable guidance.

Whilst it is accepted that the onshore elements of Norfolk Boreas, much the same as Norfolk Vanguard, would have the potential to impact the landscape and visual amenity, measures have been "design-in" to minimise these impacts. In the case of the Substation and National Grid Substation Extension, existing vegetation and landform are being utilised to minimise the impact of views. The figures contain within Chapter 29 demonstrate existing and indicative proposed landscaping which includes planting and bunding in key areas that have been identified as more open or particularly sensitive. We note the "layering" approach which is being employed of proposed hedge, nurse

woodland and core woodland, and when combined with existing vegetation and landscaping is likely to create a more natural appearance than large blocks of woodland would otherwise create. Whilst removal of vegetation is not explicitly depicted on the plans, there are areas of replacement hedge shown which are minimal.